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Measurement of selenium levels in cultivated Japanese and Korean oysters and Japanese rock oysters using the 17.4-s neutron activation product 77mSe

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Oysters in Japan are mainly cultivated in Miyagi, Hiroshima, and Hokkaido Prefectures. Sometimes baby cultivated oysters are exchanged between Japan and Korea; so both cultivated oysters are said to be genetically similar. Since Japanese consume a fair amount of raw oysters, it is of interest to compare the elemental levels of oysters from different areas. Soft tissues of cultivated Japanese oysters (Miyagi Prefecture, 2004 Nov, at 1, 6 and 11 m depths), Korean oysters (Koje-do and Kosong in Busan, 2002 Oct, 2004 Jan, and 2005 Dec), and Japanese rock oysters (Honshu Island) were analyzed for selenium levels. The soft tissues, namely hepatopancreas, gill, muscle, and mantle were separated, freeze-dried, pulverized, and analyzed by an instrumental neutron activation analysis (INAA) method in conjunction with Compton suppression spectrometry (INAA-CSS). The method consisted of irradiation of samples for 12 s in a neutron flux of 5x1011 cm-2s-1 using the rapid cyclic pneumatic sample transfer system at the Dalhousie University SLOWPOKE-2 reactor (DUSR) facility, decay for 15-20 s, and counting for 60 s. The 161.9-keV gamma-ray of the 17.4-s nuclide 77mSe was used for assaying selenium. The method was validated using NIST, NRC and NIES certified reference materials. An absolute detection limit of 0.15 µg selenium using NIST SRM 1566b Oyster Tissue was achieved. Selenium levels between Japanese and Korean oysters did not show much difference. The selenium concentrations in Japanese rock oysters showed the following trend: gill > hepatopancreas > mantle > muscle.

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